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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/580,498	05/30/2000	Shinya Kamimura	925-143	8341
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NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				

EXAMINER
AGGARWAL, YOGESH K

ART UNIT	PAPER NUMBER
2615	

DATE MAILED: 12/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/580,498

Applicant(s)

KAMIMURA ET AL.

Examiner

Yogesh K. Aggarwal

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) 4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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Examiner's response:

1. As an aid in answering Applicant's assertion, a brief summary of the relevant references is as follows: Hoopman discloses focal lengths of microlenses are shorter at the center of the array than at the periphery of the array. As also recited in the previous office action, Hoopman teaches that the desired lens radius, R_s , may vary across the array e.g, it may be shorter toward the center of the array than at the periphery (col. 9 lines 22-25). Therefore the size of the microlenses (size of a microlens is dependent upon the radius, as the radius increases the size of the microlens increases and vice-versa) along the substrate surface in the lateral direction becomes gradually larger, as the location of the microlens is getting closer to the peripheral region from the middle camera region. Hoopman thus uses increased focal length along with increasing radius (increasing the size of the microlenses) in order to counteract the lack of focusing occurring at the periphery (See col. 3 lines 33-53 and col. 4 lines 3-15 and also col. 9 lines 22-25).

2. Tokumitsu was used to disclose the recited claim limitation "wherein the position of the center of each of the light focusing parts is shifted gradually larger toward the center of the camera region based on the position of each of the light-receiving parts corresponding to the light focusing parts". Tokumitsu discloses a solid-state image sensor used inherently in devices like cameras or other imaging devices (figure 3), which comprises a plurality of light-receiving parts (pixels 3a-0, 3b-0 etc.) arranged at a constant interval on a substrate surface and a plurality of light focusing parts (microlenses 1a-0, 1b-0, 1a-1 etc.) disposed corresponding to each of the plurality of the light-receiving parts on the substrate surface (11) so that the incident light is focused on the light receiving parts (col. 3 lines 54-64). Tokumitsu further teaches that the

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distances da1-da3 (offset amounts) corresponding to the center of the microlenses 1a-1 through 1a-3 and pixels in the peripheral ends are determined to increase at a predetermined rate as the pixels become distant from the center towards the periphery (col. 3 line 65-col. 4 line 47, figure 3). Tokumitsu, like Hoopman is concerned with the lack of brightness at the periphery (“shading” in Tokumitsu, See col. 1 lines 22-27).

3. Applicant asserts on pages 2 and 3 that there is nothing in the art of record which would have caused one of ordinary skill in the art to have done both center offsetting and increasing the size of the light focusing parts towards the peripheral region. Since Tokumitsu's lens centers have been shifted toward the periphery, there is no reason why one of ordinary skill in the art would have also increased the focal lengths of the lenses toward the periphery as alleged by the Office Action. The shifting of Tokumitsu's lenses alleviate any need to make such a change. There is simply no suggestion or motivation in the cited art for the combination of (a) and (b) as required by claim 1.” **The Examiner respectfully disagrees.** Hoopman explicitly teaches that by selecting desired lens radius, R_s , [In this case R_s is shorter toward the center than at the periphery] **an optimum performance for the array as a whole is achieved (col. 9 lines 26-28) leading to improved performance.** Specifically, by correcting the focus problems at the periphery, Hoopman teaches that brightness levels at the periphery will be improved. With Tokumitsu also seeking to improve brightness levels at the periphery by varying the center offset, one of ordinary would have had a reasonable expectation that in combining the theories of Hoopman and Tokumitsu would have led to an even greater increase in brightness at the periphery than either one alone. Therefore, the rejection is till seen as proper and has been maintained.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tokumitsu (US Patent # 6,008,511) in view of Hoopman (US Patent # 5,439,621).

[Claim 1]

Tokumitsu discloses a solid-state image sensor used inherently in devices like cameras or other imaging devices (figure 3), which comprises a plurality of light-receiving parts (pixels 3a-0, 3b-0 etc.) arranged at a constant interval on a substrate surface and a plurality of light focusing parts (microlenses 1a-0, 1b-0, 1a-1 etc.) disposed corresponding to each of the plurality of the light-receiving parts on the substrate surface (11) so that the incident light is focused on the light receiving parts (col. 3 lines 54-64). Tokumitsu further teaches that the distances $da1$ - $da3$ (offset amounts) corresponding to the center of the microlenses 1a-1 through 1a-3 and pixels in the peripheral ends are determined to increase at a predetermined rate as the pixels become distant from the center towards the periphery (col. 3 line 65-col. 4 line 47, figure 3) and therefore reads on wherein the position of the center of each of the light focusing parts is shifted gradually larger toward the center of the camera region based on the position of each of the light-receiving parts corresponding to the light focusing parts.

Tokumitsu fails to disclose that the size of the microlenses along the substrate surface in the lateral direction becomes gradually larger, as the location of the light focusing part is getting closer to the peripheral region from the middle camera region.

However Hoopman discloses a microlens array as a group of lenses used as a focusing means or an image forming means so as to increase the sensitivity of a primary image sensor (Background of the invention). Hoopman further teaches that the desired lens radius, R_s , may vary across the array e.g, it may be shorter toward the center of the array than at the periphery (col. 9 lines 22-25). Therefore size of the microlenses along the substrate surface in the lateral direction becomes gradually larger, as the location of the light focusing part is getting closer to the peripheral region from the middle camera region in order to have an optimum performance for the array as a whole.

Therefore taking the combined teachings of Tokumitsu and Hoopman, it would have been obvious to one skilled in the art to have been motivated to have the size of the microlenses along the substrate surface in the lateral direction becomes gradually larger, as the location of the light focusing part is getting closer to the peripheral region from the middle camera region in order to have an optimum performance for the array as a whole as taught in Hoopman (col. 9 lines 26-28).

[Claims 2 and 3]

Tokumitsu discloses a two-dimensional array (figure 2). Therefore the direction from the center of the camera region to the peripheral camera region corresponds to the lateral and longitudinal direction of the solid-state camera device.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yogesh K. Aggarwal whose telephone number is (571) 272-7360. The examiner can normally be reached on M-F 9:00AM-5:30PM.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571)-272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

YKA

December 2, 2005

A handwritten signature in black ink, appearing to read 'David Ometz', with a long horizontal stroke extending to the right.

DAVID OMETZ
SUPERVISORY PATENT EXAMINER